

<p align="center">2 NINHYDRIN</p>	<p align="center">Page 1 of 2</p>
<p align="center">Division of Forensic Science</p> <p align="center">LATENT FINGERPRINTS PROCEDURES MANUAL</p>	<p align="center">Amendment Designator:</p>
	<p align="center">Effective Date: 29-January-2004</p>
<p align="center">2 NINHYDRIN-Porous Items</p> <p>2.1 INTRODUCTION</p> <p>Ninhydrin, or triketo-hydrindene hydrate, is an extremely sensitive indicator of alpha-amino acids, proteins, peptides and polypeptides. The reaction produces a violet to blue-violet coloring of these substances and is effective even with older deposits and/or minute amounts of amino acids. While ninhydrin can be used on any surface, processing normally is confined to porous items which are not water-soaked and do not contain inherent animal proteins.</p> <p>2.2 PREPARATIONS</p> <p>Ninhydrin is readily soluble in most organic solvents. Working solutions of ninhydrin are governed by the nature of the solvent and the strength of the solution. Concentrations of the ninhydrin solution may vary according to application, but generally a 0.5% to 1.0% weight to volume mixture produces the best results. A 0.5% concentration is recommended for routine porous item processing. Ethanol, methanol, petroleum ether, and acetone have high damage potential but are acceptable for non-document porous material. Any of the listed solvents may be used at the examiner's discretion. Commercially prepared ninhydrin may be used, no specific preparation is needed.</p> <p>Recommended Preparation- 0.5% concentration:</p> <p>2.2.1 Petroleum Ether</p> <p>2.2.1.1 Chemicals Required</p> <ul style="list-style-type: none"> • 10 grams Ninhydrin • 60 ml Methanol • 80 ml 2 - Propanol (Isopropyl Alcohol) • 1860 ml Petroleum Ether (Fill measured beaker to the 2000 ml Level) <p>2.2.1.2 Directions</p> <ol style="list-style-type: none"> 1. Dissolve Ninhydrin crystals in Methanol. 2. Add 2 - Propanol to Ninhydrin/Methanol solution and stir. 3. Add Ninhydrin, Methanol, 2 - Propanol solution to Petroleum Ether and stir. <p>2.2.2 Acetone</p> <p>2.2.2.1 Chemicals Required</p> <ul style="list-style-type: none"> • 25 grams Ninhydrin • 4 liters of Acetone <p>2.2.2.2 Directions</p> <ol style="list-style-type: none"> 1. Dissolve Ninhydrin crystals in Acetone. <p>2.2.3 Test Strips</p> <p>2.2.3.1 Chemicals Required</p> <ul style="list-style-type: none"> • 1 gram Norleucine • 100 ml warm distilled water • blotter papers 	

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<div data-bbox="297 260 513 289" data-label="Section-Header"> <p>2.2.3.2 Directions</p> </div> <div data-bbox="404 317 961 411" data-label="List-Group"> <ol style="list-style-type: none"> 1. Dissolve Norleucine in distilled water until clear. 2. Saturate blotter papers and air dry. 3. Cut papers in small pieces. </div> <div data-bbox="151 441 475 470" data-label="Section-Header"> <p>2.3 INSTRUMENTATION</p> </div> <div data-bbox="209 501 1528 564" data-label="Text"> <p>An environmental chamber or a steam iron may be used to control the heat and relative humidity that the item of evidence is submitted to after processing.</p> </div> <div data-bbox="151 592 732 621" data-label="Section-Header"> <p>2.4 MINIMUM STANDARDS AND CONTROLS</p> </div> <div data-bbox="209 651 1536 741" data-label="Text"> <p>Process a test strip as in 2.5.1 or 2.5.2. If the test strip turns purple the working solution can be used to process evidence. Documentation of this process must be included in examiners notes to show a positive reaction. This can be done by writing "positive reaction", "+", or "purple".</p> </div> <div data-bbox="151 768 565 798" data-label="Section-Header"> <p>2.5 PROCEDURE OR ANALYSIS</p> </div> <div data-bbox="209 827 719 856" data-label="Text"> <p>All applications should be done in a fume hood.</p> </div> <div data-bbox="209 884 383 913" data-label="Section-Header"> <p>2.5.1 Dipping</p> </div> <div data-bbox="297 940 1536 1152" data-label="List-Group"> <ol style="list-style-type: none"> 1. Completely immerse each item to be processed in the working solution until the item is completely saturated, usually five seconds or less. The item can be manipulated using tongs or forceps. 2. Remove and allow the item to dry completely. 3. Place the item in the heat/humidity chamber at no greater than 80 degrees centigrade and between 60% and 80% relative humidity, or the item may be steam ironed. 4. Check the item periodically to monitor the impression development. Care should be taken not to saturate the item with water vapor. </div> <div data-bbox="209 1182 540 1213" data-label="Section-Header"> <p>2.5.2 Brushing and Spraying</p> </div> <div data-bbox="297 1241 1547 1302" data-label="Text"> <p>Larger items which will not fit conveniently into processing trays can be saturated with the ninhydrin solution using a soft bristle paint brush. The items may also be processed by spraying. Spray the item until saturated and air dry.</p> </div> <div data-bbox="151 1329 621 1356" data-label="Section-Header"> <p>2.6 INTERPRETATION OF RESULTS</p> </div> <div data-bbox="209 1388 1518 1449" data-label="Text"> <p>Ninhydrin coloration is not permanent, and while some impressions have remained visible for years, others have faded in a matter of days. Photographic preservation is essential and must be accomplished as soon as possible.</p> </div> <div data-bbox="151 1476 388 1505" data-label="Section-Header"> <p>2.7 REFERENCES</p> </div> <div data-bbox="209 1535 1515 1919" data-label="List-Group"> <ul style="list-style-type: none"> • Cowger, James F. <i>Friction Ridge Skin Comparison and Identification of Fingerprints</i>; Boca Raton: CRC Press, 1993. • Lee, Henry C.; Gaensslen, R. E., eds. <i>Advances in Fingerprint Technology</i>; Elsevier Science Publishers: NY, 1991. • Lennard, Christopher J.; Pierre A. Margot. "Sequencing of Reagents for the Improved Visualization of Latent Fingerprints"; <i>Journal of Forensic Identification</i>, September/October 1988, 38, 5, pp 197-210. • Kent, Terry, ed. <i>Fingerprint Development Techniques</i>; Heanor Gate Publisher; Derbyshire, England, 1993. • Olson, Robert. <i>Scott's Fingerprint Mechanics</i>; Charles C. Thomas Publisher; Springfield, IL, 1978. • Pounds, C.A.; R.J. Jones. "Physicochemical Techniques in the Development of Latent Fingerprints"; <i>Trends in Analytical Chemistry</i>, 1983, 2, 8, pp180-183. </div>	